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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Edward D. Manzo Cook, Alex, McFarron, Manzo, Cummings & Mehler, Ltd. 200 West Adams St., Ste. 2850 Chicago, IL 60606			EXAMINER QI, ZHI QIANG	
			ART UNIT 2871	PAPER NUMBER

DATE MAILED: 07/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/800,483

Applicant(s)

SATAKE ET AL.

Examiner

Mike Qi

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-41 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-41 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☒ Certified copies of the priority documents have been received in Application No. 09/332,792.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. ____.  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date ____.   | 6) <input type="checkbox"/> Other: ____.                                    |

## **DETAILED ACTION**

### ***Claim Objections***

1. Claims 14, 24 and 34 are objected to because of the following informalities:  
recitation “. . .a video cameral.” Should be “. . . a video camera.”. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:  
  
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
3. Claims 22 and 32 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 22 and 32, recitation “. . . a maximum height of said projection from the surface of said pixel electrode is greater than 1  $\mu\text{m}$ .” that is indefinite and is not correct. Because there is no any maximum limit, and the height can be any height as long as the height greater than 1  $\mu\text{m}$ .

### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the

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applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1 and 6 are rejected under 35 U.S.C. 102(e) as being anticipated by US 5,805,252 (Shimada et al).

Claim 1, Shimada discloses (col.9, line 2- col.12, line 2; Fig.14) that a liquid crystal display device comprising:

- a reflection electrode as a pixel electrode (38) made of aluminum is formed over a substrate (31);
- an oxidized layer (38a) (aluminum oxide) and a vertical alignment film (44) (alignment film made of organic resin such as polyamide resin) are dielectric material as the dielectric multi-layer film of the reflection layer;
- a surface of the pixel electrode (38) has convex or concave portions (bumps 42a).

Claim 6, Shimada discloses (col.9, line 2- col.12, line 2; Fig.14) that a liquid crystal display device forming method comprising:

- forming a switching element (TFT 40) on a substrate (31);
- forming a pixel electrode (38) connected to the TFT (40), and the pixel electrode (38) being provided with a concave or convex portion (bumps 42a) on its surface;
- forming oxidized layer (38a) (aluminum oxide) and vertical alignment film (44) (alignment film made of organic resin such as polyamide resin) are dielectric

material as the dielectric multi-layer film on the top surface of the pixel electrode (38).

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 2-5 and 7-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimada as applied to claims 1 and 6 above, and further in view of US 6,124,912 (Moore).

Claim 2, lacking limitation is such that the dielectric multi-layer comprising first film having a lower refractive index and a second film having a higher refractive index, and adjusting the film thickness to satisfy the relation of  $\lambda = 4nd$ .

However, Moore discloses (col.5, line 65 – col.6, line 27) that using equations, the thickness of the dielectric layers are adjusted to provide a ninety degree phase shift when light waves pass through a medium, and as shown in Fig.6, the reflectance increased as selecting the light wavelength between 400 nm to 500 nm, and  $\lambda = 4nd$ .

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to adjust the film thickness to satisfy  $\lambda = 4nd$  as claimed in claim 2 for achieving a desired reflectance.

Claim 3, Shimada discloses (col.9, line 2- col.12, line 2; Fig.14) that the pixel electrode (38) made of aluminum.

Claims 4 and 7, Shimada discloses (col.9, line 2- col.12, line 2; Fig.14) that the pixel electrode (38) is formed on an insulating film (42) in contact therewith, and has concave or convex portion (bumps 42a).

Claim 5, Shimada discloses (col.9, line 2- col.12, line 2; Fig.14) that a liquid crystal (49) is sealed between a pair of substrates (30a, 30b), the liquid crystal display device comprising the pixel electrode (38) arranged in a matrix manner on one substrate (31), a thin film transistor (TFT 40) connected to the pixel electrode (38) and a reflection layer (38a).

Claim 8, Shimada discloses (col.3, lines 3-33) that the metallic thin film (pixel electrode is a metallic film) using etching for removing precipitated particles to form the asperities of the surface, i.e., having the concave or convex portion on the surface.

Claims 9-10, Shimada discloses (col.4, lines 35-63) that in order to obtain more scattering properties of the reflector (pixel electrode with concave or convex), the aluminum layer (pixel electrode) needs to be heated, and the heating will oxidize the metal, so that the pixel electrode should be subjected to the anodic oxidation, i.e., forming the pixel electrode having the concave or convex portion on its surface comprising an anodic oxidation and heating.

Claims 11-12, Shimada discloses (col.10, lines 58-63; col.11, lines 29-41) that the vertical alignment film material is applied on the substrate (31) by using a spin-coater, and the reflection electrode is formed by sputtering or deposition in a vacuum,

i.e., the dielectric multi-layer film forming step comprising coating by spin coat and a sputtering or a vacuum evaporation.

Claims 13-20, the limitations are only given weight as intended use as any display can be used for the electronic device such as personnel computer having keyboard, video camera, mobile computer, goggle-type display, DVD or CD player, digital camera, projector, etc, and that would have been at least obvious.

8. Claims 21-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,805,252 (Shimada et al) in view of US 6,124,912 (Moore).

Claim 21, Shimada discloses (col.9, line 2- col.12, line 2; Fig.14) that a liquid crystal display device comprising:

- a substrate (31);
- a switching element (TFT 40) comprising at least one thin film transistor formed over the substrate (31);
- an interlayer insulating film (42) formed over the substrate (31) and the switching element (TFT 40);
- a light reflective pixel electrode (38) formed over the interlayer insulating film (42) wherein the light reflective pixel electrode (38) has a plurality of projections (bumps 42a) on its surface.

Shimada does not explicitly disclose that a multi-layer comprising a first film and a second film formed on the first film wherein the second film has a higher refractive index than the first film.

However, Moore discloses (col.1, line 66 – col.3, line 58) that two dielectric layers are applied formed a reflective conductive surface, such as a reflective metal (pixel electrode), to increase the reflectance; and dielectric layers are formed such that the alternate between a high index of refraction and a low index of refraction, so that the reflected light waves constructively interfere to increase the reflectance of the surface.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use a multi-layer film as claimed in claim 21 for achieving constructively interfere to increase the surface reflectance of the pixel electrode.

Claim 22, Shimada disclose (col.2, lines 36-58; Figs.5A-5C) that the height (H) (a height of the projection from the surface of the pixel electrode) is  $0.01\ \mu\text{m}$  to  $2.0\ \mu\text{m}$  (greater than  $1\ \mu\text{m}$ ). The maximum height is great than  $1\ \mu\text{m}$ , so that means any height such as  $2.0\ \mu\text{m}$  is greater than  $1\ \mu\text{m}$  (there is no maximum limit).

Claims 23-30, the limitations are only given weight as intended use as any display can be used for the electronic device such as personnel computer having keyboard, video camera, mobile computer, goggle-type display, DVD or CD player, digital camera, projector, etc, and that would have been at least obvious.

9. Claims 31-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,805,252 (Shimada et al) in view of US 5,587,816 (Gunjima et al) and US 6,124,912 (Moore).

Claim 31, Shimada discloses (col.9, line 2- col.12, line 2; Fig.14) that a liquid crystal display device comprising:

- a substrate (31);



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- a switching element (TFT 40) comprising at least one thin film transistor formed over the substrate (31);
- an interlayer insulating film (42) formed over the substrate (31) and the switching element (TFT 40);
- a light reflective pixel electrode (38) formed over the interlayer insulating film (42) wherein the light reflective pixel electrode (38) has a plurality of projections (bumps 42a) on its surface.

Shimada does not explicitly disclose that a multi-layer comprising a first film with a refractive index of 0.7 or less and a second film formed on the first film wherein the second film has a refractive index of 1.8 to 6.0.

According to the claim 41 which is dependent on the claim 31, the material of the first film selected from the group consisting of  $\text{SiO}_2$ ,  $\text{MgF}_2$ ,  $\text{Na}_3\text{AlF}_6$ , acrylic and polyimide, and the material of the second film selected from the group consisting of  $\text{TiO}_2$ ,  $\text{ZrO}_2$ ,  $\text{Ta}_2\text{O}_5$ ,  $\text{ZnS}$ ,  $\text{ZnSe}$ ,  $\text{ZnTe}$ ,  $\text{Si}$ ,  $\text{Ge}$ ,  $\text{Y}_2\text{O}_3$  and  $\text{Al}_2\text{O}_3$ .

However, Gunjima discloses (col.9, lines 6-13) that the material of a dielectric film such as  $\text{SiO}_2$ ,  $\text{MgF}_2$ ,  $\text{Na}_3\text{AlF}_6$  (first film) having a refractive index (normally) 1.4 to 2.5 that cannot be 0.7 or less. Therefore, the claim 31 in which a first film with a refractive index of 0.7 or less that is in contradiction with the claim 41.

Thus, the possibility is the second film having a higher refractive index than the first film.

However, Moore discloses (col.1, line 66 – col.3, line 58) that two dielectric layers are applied formed a reflective conductive surface, such as a reflective metal (pixel

electrode), to increase the reflectance; and dielectric layers are formed such that the alternate between a high index of refraction and a low index of refraction, so that the reflected light waves constructively interfere to increase the reflectance of the surface.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to use a multi-layer film as claimed in claim 31 for achieving constructively interfere to increase the surface reflectance of the pixel electrode.

Claim 32, Shimada disclose (col.2, lines 36-58; Figs.5A-5C) that the height (H) (a height of the projection from the surface of the pixel electrode) is  $0.01\ \mu\text{m}$  to  $2.0\ \mu\text{m}$  (greater than  $1\ \mu\text{m}$ ). The maximum height is great than  $1\ \mu\text{m}$ , so that means any height such as  $2.0\ \mu\text{m}$  is greater than  $1\ \mu\text{m}$  (there is no maximum limit).

Claims 33-40, the limitations are only given weight as intended use as any display can be used for the electronic device such as personnel computer having keyboard, video camera, mobile computer, goggle-type display, DVD or CD player, digital camera, projector, etc, and that would have been at least obvious.

10. Claim 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shimada, Gunjima and Moore as applied to claims 31-40 above, and further in view of Us 4,822,144 (Vriens).

Claim 41, lacking limitation is such that the material of the first film and the material of the second film.

However, Vriens discloses (col.4, lines 51-63) that a dielectric multi-layer comprising layers alternately having a high and a low refractive index, and the material for the layer (21) (first film) having low refractive index, e.g.,  $\text{MgF}_2$  or  $\text{SiO}_2$ , and the

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material for the layer (22) (second film) having high refractive index, e.g.,  $ZrO_2$ ,  $TiO_2$ , or  $Ta_2O_5$ . Vriens indicates (col.2, lines 10-28) that using the interference of such filter (dielectric multi-layer), the light would be substantially completely reflected for all angle of incidence.

Therefore, it would have been obvious to those skilled in the art at the time the invention was made to select the material for the first and second film as claimed in claim 41 for improving the reflectance.

### ***Double Patenting***

11. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

12. Claims 1-41 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-55 of U.S. Patent No. 6,426,787.

Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims 1-55 of the patent 6,426,787 have a very

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corresponding limitations with the claims 1-41 of this application except a few wording are different, but substantially they have the doctrine of obviousness-type double limitations.

The claims 1-41 of this application corresponding to the claims 1-55 of the patent 6,426,787, except limitations such as the second refractive index is in a range of 1.8 to 6.0, and the first refractive index has a ratio of 0.7 or less with respect to the second refractive index are in the patent 6,426,787.

### ***Conclusion***

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.


14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mike Qi whose telephone number is (571) 272-2299.

The examiner can normally be reached on M-T 8:00 am-5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (571) 272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mike Qi  
July 7, 2004



TARIFUR R. CHOWDHURY  
PRIMARY EXAMINER